WHAT IS CLAIMED IS:

1   1.   A method for operating an engine control module having a
2 volatile memory and a first non-volatile memory, the engine control module
3 operable for copying data between the memories, such as calibration data used to
4 control operation of the engine, the method comprising:
5   partitioning the volatile memory and the first non-volatile memory
6 into user-changeable and non-user-changeable portions, the portions including
7 calibration data for use by the engine control module to control an engine; and
8   copying only the user-changeable portion of the volatile memory to
9 the first non-volatile memory for storage in response to changing of the calibration
10 data stored at the volatile memory.

1   2.   The method of claim 1 further comprising backing up the
2 user-changeable portion of the first non-volatile memory prior to receiving the
3 changed calibration data, the backing up comprising copying only the user-
4 changeable portion of the first non-volatile memory to a second non-volatile memory
5 for storage.

1   3.   The method of claim 2 wherein the backing up comprises
2 compressing the user-changeable portion of the first non-volatile memory prior to
3 copying to the second non-volatile memory, the second-volatile memory
4 correspondingly storing a compressed version of the user-changeable portion of the
5 first non-volatile memory.

1   4.   The method of claim 2 further comprising verifying the
2 calibration instruction copied to the first non-volatile memory prior to backing up
3 the calibration data to the second non-volatile memory.

1   5.   The method of claim 4 further comprising copying to the
2 volatile memory in response to rebooting of the engine control module one of (i) the
3 user-changeable and non-user-changeable portions of the first non-volatile memory

4   or (ii) the entire second non-volatile memory and the non-user-changeable portion

5   of the first non-volatile memory.

1   6.   The method of claim 5 wherein the user-changeable and

2   non-user-changeable portions of the first non-volatile memory is copied to the

3   volatile memory if the first non-volatile memory is without defects.

1   7.   The method of claim 5 wherein the entire second non-volatile

2   memory and the non-user-changeable portion of the first non-volatile memory are

3   copied to the volatile memory if the first non-volatile memory is defective.

1   8.   The method of claim 5 further comprising uncompressing the

2   entire second non-volatile memory if copied to the volatile memory.

1   9.   The method of claim 1 wherein partitioning the memory

2   comprises predefining which portions of the memory includes data which may be

3   changed based on the engine operation controlled by the data.

1   10.   A method for limiting memory failure of a engine control

2   module, the method comprising:

3   partitioning a volatile memory and a first non-volatile memory of the

4   engine control module into user-changeable and non-user-changeable portions, the

5   portions including calibration data for use by the engine control module to control

6   an engine; and

7   copying only the user-changeable portion of the volatile memory to

8   the user-changeable portion of the first non-volatile memory in response to changing

9   of the calibration data stored at the volatile memory to limit memory failure due to

10   repeatedly copying the calibration data to the first non-volatile memory.

1   11.   The method of claim 10 further comprising backing up the

2   user-changeable portion of the first non-volatile memory prior to receiving the

3   changed calibration data, the backing up comprising copying only the user-

4   changeable portion of the first non-volatile memory to a second non-volatile memory

5   for storage.

1   12.   The method of claim 11 wherein the backing up comprises

2   compressing the user-changeable portion of the first non-volatile memory prior to

3   copied to the second non-volatile memory, the second-volatile memory

4   correspondingly storing a compressed version of the user-changeable portion of the

5   first non-volatile memory.

1   13.   The method of claim 11 further comprising verifying the

2   calibration instruction copied to the first non-volatile memory prior to backing up

3   the calibration data to the second non-volatile memory.

1   14.   The method of claim 13 further comprising copying to the

2   volatile memory in response to rebooting of the engine control module one of (i) the

3   user-changeable and non-user-changeable portions of the first non-volatile memory

4   or (ii) the entire second non-volatile memory and the non-user-changeable portion

5   of the first non-volatile memory.

1   15.   The method of claim 14 wherein the user-changeable and

2   non-user-changeable portions of the first non-volatile memory is copied to the

3   volatile memory if the first non-volatile memory is without defects.

1   16.   The method of claim 14 wherein the entire second non-volatile

2   memory and the non-user-changeable portion of the first non-volatile memory are

3   copied to the volatile memory if the first non-volatile memory is defective.

1   17.   The method of claim 14 further comprising uncompressing the

2   entire second non-volatile memory if copied to the volatile memory.

1   18.   The method of claim 10 wherein partitioning the memory

2   comprises predefining which portions of the memory include data which may be

3   changed based on the engine operation controlled by the data.

1   19.   An engine control module for controlling an internal

2 combustion engine, the engine control module comprising:

3   a processor for executing instruction to control the engine;

4   a first non-volatile memory having first and second partitions, the

5 first partition storing engine calibration data classified as user-changeable, the

6 second partition storing engine calibration data classified a non-user-changeable;

7   a volatile memory that is loaded with the contents of both the first and

8 second non-volatile memory partitions at reset of the engine control module such

9 that the engine control module operates using the volatile memory wherein the

10 processor executes data to control the engine in accordance with the user-changeable

11 and non-user-changeable parameters;

12   wherein, in response to the changing of the user-changeable engine

13 calibration data in the volatile memory, the engine controller is configured to copy

14 only the user-changeable engine calibration data from the volatile memory to the

15 first partition of the first non-volatile memory.

1   20.   The engine control module of claim 19 further comprising a

2 second non-volatile memory, the engine control module configured to verify the

3 changes to the changed first-partition and to copy the changed first partition of the

4 non-volatile memory to the second non-volatile memory if the changes are verified.